

REMARKS

Favorable reconsideration of this application in view of the remarks to follow is respectfully requested.

Before addressing the rejections of the present Office Action, Claim 30 has been amended. Specifically, Claim 30 has been amended to positively and distinctly recite that the inventive field effect transistor comprises *a semiconductor substrate of a single crystal semiconducting material*. Support for this amendment to Claim 30 is found throughout the present specification. Referring to Page 7, lines 5-10 of the present specification, applicants disclose that:

“substrate 12 may be a single crystal semiconductor material suitable to form the channel of a MOSFET to be built. Substrate 12 may be, for example, silicon, silicon germanium, germanium, gallium arsenide, indium gallium arsenide, indium phosphide, and indium gallium arsenide phosphide.”

Claims 30 and 33 stand rejected under 35 U.S.C. §103(a) as allegedly unpatentable over U.S. Patent No. 5,159,416 to Kudoh (“Kudoh”) in view of U.S. Patent No. 4,521,446 to Coleman, et al. (“Coleman, et al.”).

Applicants respectfully submit that the claims of the present application are not obvious from the disclosures of the combined applied references, since the applied references do not teach or suggest applicants’ claimed device, as recited in amended Claim 30. More specifically, the applied references fail to teach or suggest applicants’ inventive field effect transistor which includes a *substrate of a single crystal semiconducting material*, as recited in amended Claim 30. “To establish a prima facie case of obviousness of a claimed invention all the claimed limitations must be taught or suggested by the prior art”. In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 44, 496 (CCPA 1970).

The primary reference, Kudoh, spurring the §103 rejection of Claims 30 and 33 fails to teach or suggest a substrate comprising a *single crystal semiconducting material*. Kudoh discloses a thin film transistor having a polycrystalline substrate. Kudoh discloses, referring to paragraph 3 lines 1-3, that the polysilicon film 12 is formed by polycrystallizing an amorphous silicon layer. Kudoh does not teach or suggest forming a substrate having a single crystal structure, as recited in amended Claim 30.

The claimed single crystal semiconducting substrate of applicants' inventive structure has a higher charge carrier mobility (i.e., approximately $300 \text{ cm}^2/\text{VS}$ of single crystal Si) than a substrate comprised of polycrystalline silicon (about $100 \text{ cm}^2/\text{VS}$), as disclosed in Kudoh. Therefore, applicants' device has a significantly faster switching speed than the prior art device. Additionally, the ohmic contacts of applicants' device has a lower resistance than the Kudoh device, since the ohmic contacts of applicants' claimed device are silicide regions, while the ohmic contacts of the Kudoh device are polysilicide. Silicide regions are formed by reacting single crystal silicon containing materials with metal, while polysilicide regions are formed by reacting polycrystalline silicon with metal. Silicide regions have a lower resistivity than polysilicide regions. Therefore, applicants' claimed device has a lower external resistance than the Kudoh device. Applicants' claimed device is clearly distinct from the Kudoh device. Modifications to Kudoh in a manner to reflect applicants' claimed device would significantly change the characteristics and operability of the Kudoh device. Modifications to the applied prior art reference cannot change the principle of operation of the primary reference. See MPEP 2145

Applicants further submit that Kudoh cannot be modified to include a single crystal substrate. Kudoh discloses a substrate including an amorphous polycrystalline silicon

layer 12 atop an oxide layer 11. Single crystal semiconducting materials do not grow on oxide, which has an amorphous crystalline structure. Therefore, since Kudoh discloses an amorphous polycrystalline silica layer 12 formed atop an amorphous oxide layer 11; single crystal Si may not be incorporated into the Kudoh device, because the amorphous layers 11, 12 do not have the requisite crystalline lattice structure for single crystal growth.

The applied secondary reference, i.e., Coleman, et al., does not alleviate the above mentioned defects in Kudoh since Coleman, et al., also does not teach or suggest applicants' claimed field effect transistor comprising a substrate having a single crystal structure. Coleman, et al. disclose a method for depositing polysilicon atop TiO₂, which includes anneal processing steps. Coleman, et al. do not disclose field effect transistor substrates or substrate compositions. Therefore, Coleman, et al. fail to teach or suggest a field effect transistor including a substrate having a single crystal semiconducting material, as recited in amended Claim 30

The §103 rejection also fails because there is no motivation in the applied references which suggests modifying the prior art structures to produce applicants' claimed device comprising a *substrate of single crystal semiconducting material*, as recited in amended Claim 30. This rejection is thus improper since the prior art does not suggest this drastic modification. The law requires that a prior art reference provide some teaching, suggestion, or motivation to make the modification obvious.

Here, there is no motivation provided in the disclosures of the applied prior art references, or otherwise of record, which would lead one skilled in the art to make the modification mentioned hereinabove. "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art


suggested the desirability of the modification.” In re Fritch, 972 F.2d, 1260,1266, 23 USPQ 1780,1783-84 (Fed. Cir. 1992).

There is no suggestion in the prior art of applicants’ claimed field effect transistor comprising *a substrate of a single crystal semiconducting material*; two spaced apart metal semiconductor compound regions forming a source and drain and defining a channel there between; a first dielectric layer on said source and drain adjacent said channel; a gate dielectric layer of local reacted metal of said metal used in said metal-semiconductor compound regions on said channel; and a conductive layer on said gate dielectric to form a gate. Therefore, all the claims of the present application are not obvious from the prior art applied in the present Office Action.

Based on the above amendments and remarks, the §103 rejection has been obviated; therefore reconsideration and withdrawal of the instant §103 rejection is respectfully requested.

Wherefore reconsideration and allowance of the claims of the present application are respectfully requested.

Respectfully submitted,


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